15 eggs is the perfect number needed to achieve a live birth after IVF

May 11 2011

An analysis of over 400,000 IVF cycles in the UK has shown that doctors should aim to retrieve around 15 eggs from a woman's ovaries in a single cycle in order to have the best chance of achieving a live birth after assisted reproduction technology.

The study, which is published online in Europe's leading reproductive medicine journal Human Reproduction [1], found that there was a strong relationship between live birth rates and the number of eggs retrieved in one cycle. The live birth rate rose with an increasing number of eggs up to about 15; it levelled off between 15 and 20 eggs, and then steadily declined beyond 20 eggs.

One of the authors of the study, Dr Arri Coomarasamy, said: "This is the first study to look at the association between the number of eggs and live births. Some smaller studies have reported previously on the association between egg numbers and pregnancy rates, but not live births. This is also the first study to devise a graph that can be used by patients and clinicians to estimate the chances of a live birth for a given number of eggs."

Dr Coomarasamy, a Clinical Reader and Consultant in Reproductive Medicine and Surgery at the University of Birmingham (UK), and his colleagues analysed data from the UK's Human Fertilisation and Embryology Authority (HFEA) on 400,135 IVF cycles that took place anywhere in the UK between April 1991 and June 2008. As live birth rates have steadily improved during this period, the researchers used data

from 2006 to 2007 to create a predictive model that most closely reflected current practice. Using the model, they created a mathematical graph, called a nomogram, which shows the relationship between women's age, the numbers of eggs retrieved and the predicted live birth rate. Now patients and clinicians can use the nomogram when making decisions about the degree of ovarian stimulation required to achieve the optimum number of eggs for a live birth.

"Our data show that around 15 eggs may be the best number to aim for in an IVF cycle in order to maximise the chances of a live birth while minimising the risk of ovarian hyperstimulation syndrome (OHSS) which is associated with a high number of eggs, usually over 20," said Dr Coomarasamy. "Mild stimulation protocols aim to retrieve less than six to eight eggs; a standard stimulation should aim for 10-15 eggs, and we believe this is what is associated with the best IVF outcomes; when the egg number exceeds 20, the risk of OHSS becomes high." [2]

He believes that doctors could combine the use of the nomogram with current methods of measuring a woman's ovarian reserve in order to work out how much her ovaries need to be stimulated in order to retrieve 15 eggs in a safe manner.

"There are tests of ovarian reserve such as anti-mullerian hormone (AMH) and antral follicle count (AFC) which are good at predicting ovarian response and the egg yield following ovarian stimulation during IVF treatment. However, AMH and AFC are not good predictors of live birth rates. If clinicians use AMH or AFC to estimate the egg yield, they can then use our nomogram to convert this estimated number of eggs into a predicted live birth rate, thus completing the prognostic chain to estimate the chances of what both they and the women want: a live born baby."

The data also showed that during 2006-2007 the predicted live birth rate

for women with 15 eggs retrieved was 40% for those aged 18-34, 36% for those aged 35-37, 27% for those aged 38-39 and 16% for women aged 40 and over.

Currently the HFEA collects data in a way that does not allow researchers to link information on IVF cycles using fresh embryos with IVF cycles using frozen embryos in the same woman. The authors of the study say that it is possible that this might alter the declining effect of higher numbers of eggs on fresh IVF cycles, because a woman has a greater chance of becoming pregnant if frozen embryos are available for transferring in subsequent cycles. However, "existing data suggest that the numbers of embryos frozen after a fresh IVF cycle are not enhanced by retrieving more than 18 eggs," write the authors.

Dr Coomarasamy said: "The HFEA have agreed to provide data linking fresh and frozen cycles to answer this research question and they may be releasing this information soon. By including the outcome following replacement of all frozen embryos generated from a single fresh IVF treatment, we could give an estimate of the cumulative live birth rate per IVF cycle. This is important information and we hope to gather the necessary data and report on this outcome in the future.

"None of this work would be possible without the support of the HFEA and we are very grateful to the staff there who validated these data."

More information: [1] "Association between the number of eggs and live birth in IVF treatment: an analysis of 400 135 treatment cycles", by Sesh Kamal Sunkara, Vivian Rittenberg, Nick Raine-Fenning, Siladitya Bhattacharya, Javier Zamora, Arri Coomarasamy. Human Reproduction journal. doi:10.1093/humrep/der106

[2] Ovarian hyperstimulation syndrome (OHSS) is an excessive response by the ovaries in response to hormone drugs administered to stimulate

the production of eggs for collection for IVF cycles. Mild and moderate OHSS causes abdominal pain, swelling and sometimes nausea and vomiting. In the rare, severe cases, it is a life-threatening medical emergency, with massive ovarian enlargement, fluid accumulation in the abdominal and pleural cavities, and risk of thrombosis.

Provided by European Society of Human Reproduction and Embryology